NavMed 369

UNITED STATES NAVY

MEDICAL NEWS LETTER

Editor - Captain L. B. Marshall, MC, USN (RET)

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Policy

The U.S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be nor are they susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Notice

Due to the shortage of medical officers, the Chief, Bureau of Medicine and Surgery, has recommended, and the Chief of Naval Personnel has concurred, that Reserve Medical Officers now on active duty who desire to submit requests for extension of active duty at their present stations for a period of three months or more will be given favorable consideration. BuPers Instruction 1926.1B applies.

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Pastoral Counseling Seminar - USNH, Corona, California

A unique Pastoral Counseling Seminar, "We Work Together," was recently held at the USNH, Corona, Calif. The Commanding Officer of the hospital, Captain Julian Love MC USN, conceived the idea and the project was approved by the Commandant of the 11th Naval District.

The seminar was designed to give members of the clergy a fuller medical background and experience. The formulations of the agenda and the numerous details concerned with the seminar were performed by LCDR H.A. Porter, CHC USNR and LCDR S.A. Mroczka, CHC USN, with the guidance and assistance of the Commanding Officer.

Members of the local clergy in the Corona Riverside area were invited to attend the sessions which were held once weekly for 3 weeks. Besides members of the hospital staff, other speakers were: Dr. Howard Bierman of the staff of the City of Hope Medical Center, Duarte, Calif.; Msgr. Matthew Thompson of St. Edward's Roman Catholic Church; Rev. S.W. Graf of the Congregational Church; Rev. Earl Robertson of the First Baptist Church of Corona,

Calif. ; Chaplain Miles Renear of the Metropolitan State Hospital, Norwalk, Calif. ; and Rabbi M. A. Robinson of Pomona, Calif.

There was an advance registration of 56 clergymen. Because some could not attend all sessions, 48 was the highest number at any individual session. It is believed that some 70 ministers were in attendance at one or another of the sessions.

The results of the conference were most gratifying. Every minister in attendance seemed most happy to be afforded the opportunity to attend the seminar. Several sent in letters of appreciation and it was the consensus that conferences of this nature should be given repeatedly and that the idea should be promulgated further. Besides the happy results originally anticipated, namely that of giving clergymen a greater understanding of the psychological and medical problems of patients and various ways in which the clergy could assist, additional benefits resulted from a public relations standpoint. The excellence of the presentations by the various members of the hospital staff did much to enhance the prestige of Naval medicine. There can be little doubt that through these clergymen others of the laity, including parents of Servicemen, will in turn receive these favorable impressions. Better cooperation between the ministry and the medical profession can only result in betterment for the patient, the clergyman, and the medical officer.

Based upon the results of this seminar, the Commanding Officer sincerely recommends that courses on pastoral counseling of patients be given in other localities. (USNH, Corona, Calif.)

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Five Million People

The challenge of chronic illness is seen in the lives of all those who are adversely affected physically, socially, economically, and particularly in the lives of the estimated 2 million adults who, though now idle, could become employable and tax-paying if provision were made for their rehabilitation. More than 90% of these persons could be brought to complete economic self-sufficiency if adequate facilities for rehabilitation were available to them.

The problem of chronic illness—much better defined as long-term illness—is illustrated by the hard core of nearly 5 and 1/2 million people in the United States with chronic disabilities sufficiently serious to require some form of care. It is illustrated daily by the continuing struggle maintained at an appalling cost in dollars, depleted energy, and lives, against the cardiovascular diseases which are responsible for more than one-half of the deaths in the country; against cancer which kills a quarter of a million Americans annually; against mental illness which brings three-quarters of a million people under some form of hospital care in the course of every 12 months; against arthritis and rheumatism; against blindness and deafness;

against epilepsy, tuberculosis, multiple sclerosis, Parkinson's disease, diabetes, cerebral palsy, and various eye disorders. In short, these diseases and handicaps account for 88% of all disabling conditions in the United States.

Chronic illness is no longer the exclusive and private business of the patient and the healing professions. It is a matter of public concern in an age when, for humanitarian reasons and for reasons of defense, the Nation is more conscious than ever before of the need for conserving human resources. In such an age, illness, disability, and preventable death are problems which the whole community must comprehend and help solve.

Of the nearly 5.5 million victims of long-term illness, 2.1 million are 65 years old and over; 1.8 million are between 45 and 65; and 1.4 million are under 45. These figures and the record of the rehabilitation of chronically ill persons should put to rest the common misconception that chronic illness is synonymous with old age and generally incurable. The rate of chronic illness in relation to age is, however, significant. It is 1.3% for those under 45; 5.8% for those between 45 and 64; and 17.1% for those 64 years old and older. Disabling illness is 13 times greater for those 65 years of age and beyond as it is for those under 45.

The Commission on Chronic Illness has evolved a number of basic principles and a series of recommendations as a result of important studies, fact-finding surveys, and research.

First, as to the individual patient himself—his needs, his rights, his personality are paramount. His needs cannot be met, his rights properly recognized, nor his personality fully respected, however, unless he is treated as a whole person. If he is regarded thus, his rehabilitation or restoration will inevitably include the services of many professions and disciplines. When more than one profession is involved, there arises the need for wise planning, skillful cooperation, and harmonious interplay among the representatives of each profession. In this integrated approach to the treatment of chronic illness, perhaps the strongest factor is the knowledge and treatment of the purely physical aspects, and the weakest is that of the social and emotional factors.

Recognition should, therefore, be given to the importance of the emotional attitude of patients whose illnesses become long drawn out, permanently crippling, or in other ways a major frustration. These attitudes embrace morale, motivation, and mood. Personnel in institutions, in the home, and the patient's family must constantly seek to help the patient endure pain, delay, and disappointment; faithfully follow difficult treatment regimens; keep hope alive; maintain a will to live; and develop a philosophy of acceptance as part of a mature faith.

Care of the chronically ill is inseparable from general medical care. While it presents certain special aspects, it cannot be medically isolated without running serious dangers of deterioration of quality of care and medical stagnation. Care and prevention are inseparable. The basic approach

to chronic disease must be preventive, and prevention is inherent in adequate care of long-term patients.

Rehabilitation is an innate element of adequate care, and the process properly begins with diagnosis. Rehabilitation is applicable alike to persons who may become employable and to those whose only realistic hope may be a higher level of self-care. Not only must formal rehabilitation services be supplied as needed, but programs, institutions, and personnel must be aggressively rehabilitation-minded.

With full appreciation of the necessity for adequate institutional facilities, and with the realization that some areas lacking in such accommodations should provide them, the commission feels that, henceforth, communities generally should place the greater emphasis on planning for care in and around the home. Adequate care of the long-term patient requires arrangements which promote frequent evaluation of the patient's needs and easy flow back and forth among home, hospital, and related institutions.

Planning and programs must be directed to the needs of all long-term patients and not limited to the needs of any special economic, racial, cultural, or other segment of the population.

Personnel shortages in the professions concerned with the chronically ill constitute a major block to improvement of care. The number of personnel must be increased by recruitment, assistance with the costs of education, attractive salaries, and other inducements.

The cost of programs to provide care to long-term patients should be measured first as to human values of effectiveness, then as to productivity. The most economical care is that which returns a person as quickly and as fully as possible to the highest attainable state of health and social effectiveness.

The primary function of philanthropy in financing long-term care should continue to be that of strategic investment of venture capital. Philanthropy should play an important role in financing the coordination of community facilities and should lead the way in the provision of more adequate care through research, demonstration, and experimentation.

Public financing of medical care for long-term indigent and medically indigent patients is inadequate in most communities whether for long-term or short-term general hospital care, mental and tuberculosis hospital care, nursing-home care, rehabilitation services, or care at home.

Increased amounts of public and private funds must be devoted to measures to coordinate the services needed by long-term patients. Private and public expenditures for research should be expanded. A vigorous program of public education should be launched to stimulate the achievement of the recommendations for financing as outlined in this presentation.

Investigations of diseases and their origins and studies of the needs and responses for maintaining and improving health should command high priority in the spending of research funds. To increase and extend the application of

knowledge gained from research, laboratory and clinical investigations must be correlated with intensive and extensive research designed to measure the dimensions of the chronic disease problem and to reveal the most appropriate and effective methods and procedures for meeting those problems. (Mayo, L. W., Five Million People: National Health Forum, Pub. Health Rep., 71: 678-680, July 1956)

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Pregnancy Complicated by Amyotrophic Lateral Sclerosis

Amyotrophic lateral sclerosis occurs on the Island of Guam and other Marianas Islands in an estimated frequency of 100 times that of the disease in the continental United States. This unexplained concentration of a rare disorder on a small and distant island chain has been the subject of an intensive investigation by clinicians, pathologists, epidemiologists, and geneticists, and the inquiry is still under way. This article deals with an investigation on the effects of pregnancy, labor, and parturition on amyotrophic lateral sclerosis; and the effect of amyotrophic lateral sclerosis on pregnancy and the newborn. It has been reported that the amyotrophic lateral sclerosis observed on Guam and the other Marianas Islands is clinically and pathologically a classic form of the disease. This illness has been recognized as highly prevalent on Guam for at least 100 years. Although the cause of this disease has not been established, the disorder on Guam is believed to be an unusual inherited form of the disease.

Amyotrophic lateral sclerosis is a neurological disorder of unknown cause which occurs in adult persons. It is invariably fatal; there is no recognized therapy. In the past, progressive muscular atrophy and progressive bulbar palsy were considered to be separate clinical entities, but today, most authorities on neurology consider them as clinical components of the symptom complex of amyotrophic lateral sclerosis.

During this study, 17 women with amyotrophic lateral sclerosis were delivered of 21 infants. In these 17 patients, whom the authors had the opportunity of studying, pregnancy did not alter the course of the disease. Pregnancy, when it did occur, and when the course of the disease was such that the patient lived sufficiently long, appeared normal. Delivery was usually spontaneous and uneventful in these multiparous patients. The infants in all but two instances were normal and have shown a normal development. The abnormalities of the two fetuses did not seem to be the results of a specific reaction to the amyotrophic lateral sclerosis. It is possible that they were related to the age of the mothers and to the secondary effects of amyotrophic lateral sclerosis, such as poor nutrition and hypoxia, which so often accompany this

disease. The absence of accelerations or remissions in the course of amyotrophic lateral sclerosis during pregnancy and the successful carrying to term of a normal pregnancy in the majority of these patients might possibly suggest that endocrine factors are not important etiologically in the disease, or are not commonly associated with amyotrophic lateral sclerosis.

Although pregnancy appears to have no direct influence upon the course of the disease, it creates many special problems for the patient and for the obstetrician caring for her. The impairment of muscular strength makes it difficult for the patient with even moderate involvement to care for herself. Unfortunately, as the pregnancy progresses, the amyotrophic lateral sclerosis can be expected to become progressively more severe. Thus, it is important to advise the patient to avoid excessive fatigue and to arrange for adequate help both for herself and, following delivery, for the baby.

The most serious complications of the disease are secondary to the paralysis of the facial, oral, and laryngeal musculature, with resultant inability to obtain adequate fluids and foods orally, as well as the additional danger of complicating aspiration pneumonia. For some patients, it may become necessary to rely on nasal gavage or gastrotomy to maintain adequate nutrition. An interested and sympathetic relative, however, who is willing to spend the necessary time to feed the patient, may be able to maintain an adequate fluid and caloric intake.

The progressive paralysis of the intercostal and diaphragm muscles, with the pregnancy and aspiration pneumonia, if it occurs, may so diminish the respiratory exchange as to create severe anoxia. An adequate airway in these patients may be difficult to maintain because of the patient's inability to handle secretions in the throat. Frequent aspiration or even tracheotomy may become necessary. Oxygen administered by tent or tube is often indicated. In certain instances, a respirator may become essential to maintain the life of the patient in the last several weeks of the pregnancy.

Delivery itself usually creates no special problems. The smooth musculature of the uterus is not involved, and the musculature of the perineal floor usually is so atrophic as to create no impediment to delivery.

The patient who has amyotrophic lateral sclerosis, although suffering from a progressive neurological disease, is mentally alert. Although the motor involvement may be severe, there is no associated sensory disturbance or dysfunction of the bladder. Unfortunately, it can be predicted that the mother with amyotrophic lateral sclerosis will not be able to care for her child through its infancy. It is almost certain that she will be dead before the child is 3 years of age. Thus, it becomes necessary for the obstetrician to assist the family and the patient in preparing for this inevitable course of events. (CDR J. W. Huston, MC USN, et al., Pregnancy Complicated by Amyotrophic Lateral Sclerosis: Am. J. Obst. & Gynec., 72: 93-99, July 1956)

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Tuberculosis and Pregnancy

From even a cursory review of the literature, it is evident that attitudes toward the problems of tuberculosis and pregnancy strongly reflect the social and economic influences of the period in which a given physician wrote. It is possible that many of the contrasting opinions arose largely because tuberculous patients were seen under so many varied circumstances that observers noted patients having little in common except tuberculous lesions and a gravid uterus. It is always to be emphasized that no two individuals react alike to infection with tubercle bacillus; it is also probable that no two women act alike during pregnancy or that no woman acts uniformly through multiple pregnancies. Recognizing that the interplay of these factors only will produce a number of clinical combinations, it is easy to understand that a clinical approach satisfactory for one woman might be wholly unsatisfactory for another woman whose clinical problem seemed superficially similar.

Therefore, it seemed advisable to study a series of tuberculous women whose obstetrical care was provided largely, or in part, at the Charity Hospital of Louisiana. Most of them were young colored women receiving antibiotic therapy in accordance with prevailing therapeutic customs. Sixty-four cases were believed to be sufficiently informative for study; no attempt at selection was made. Although this series is small and has the defect of only short-term follow-up, it has the merit of personal acquaintance with the conditions under which these people were treated.

Another change in the times must be noted. Whereas, formerly the weighty decisions concerning tuberculosis in pregnancy were made by the sanatorium physician, today these lie within the province of the practitioner. Quite frequently, tuberculosis is brought to light only when the woman reports for supervision during pregnancy; this is especially true in patients who have returned to normal full activities after treatment for tuberculosis. The clinician must often advise whether pregnancy should be sanctioned, simply condoned, or even forbidden. Opinions expressed in this article are based on the experiences in the treatment of 64 women in poor social and economic circumstances. The majority were treated with varying combinations of streptomycin, para-amino-salicylic acid and isoniazid; a number had undergone collapse or excisional therapy.

While pregnancy does unquestionably impose a burden on the tuberculous woman, this burden is not insuperable. The risks while tuberculosis is active cause physicians to counsel deferment of pregnancy until the tuberculosis has reached the stage of inactivity (National Tuberculosis Association Diagnostic Standards 1950) for 2 years if minimal, 3 years if moderately advanced, and 5 years if far advanced. The familiar tragedy of rapidly progressing tuberculosis in the pregnant or parturient woman has left its impress on medical thinking.

It has been aptly said that the chief cause of disaster to the tuberculous woman is not the baby in the womb, but the baby in the home. When the mother must care for the newborn child, she has little time to care for herself. In an earlier era, the woman who obtained a good pneumothorax for unilateral tuberculosis early in the course of her pregnancy, seldom had difficulty and succeeded in inactivating her disease. Because of these conflicting considerations, the value of terminating the pregnancy of a tuberculous woman has always been uncertain. The most recent report of Schaefer, et al., sheds considerable light on this controversial section of the problem. Their observation that interruption of pregnancy does not favorably influence the course of tuberculosis is supported by their findings that three months after therapeutic abortion only 13% of the aborted patients had improved as compared to 56% of those who had spontaneous full term or premature deliveries.

In general, the treatment for tuberculosis should proceed exactly as if the woman were not pregnant with few exceptions. Antibiotic therapy should be conducted as otherwise indicated; if the tuberculosis has been inactive at least for two years, chemotherapy is unnecessary. If the disease has not been inactive that long, chemotherapy is needed. Apparently, the fetus is not adversely affected by antibiotics given to the mother. Bed rest should be used as otherwise indicated. Excisional surgery is seldom performed during pregnancy, but has been done without causing spontaneous abortion. Artificial pneumothorax has been maintained without event throughout pregnancy, but pneumoperitoneum should be discontinued by the fourth month of pregnancy to avoid penetration of the uterus.

The best protection of the newborn baby is to prevent tubercle bacilli from reaching it. If the mother has been rendered sputum negative prior to delivery, protection is maximum. This can be accomplished either by closing cavities with some form of collapse therapy or by the use of antibiotics. Occasionally, it is accomplished by excisional surgery although this is unusual. The mother should not nurse the baby for two reasons: Contact between mother and baby should be broken until the mother has definitely reached the stage of inactive tuberculosis. (2) The mother should not have such responsibility until she is regarded as well enough to assume her domestic tasks. The dangers of infection to the baby are well known and are real.

Pregnancy does impose an additional stress for the tuberculous woman, a stress almost impossible to measure quantitatively or to evaluate statistically. Most women, particularly those anxious for children, can tolerate this stress today with the antibiotics currently available. To reduce this stress to the minimum, tuberculous women should be advised to defer pregnancy until the disease has been inactive at least 2 years if minimal, 3 years if moderately advanced, 5 years if far advanced. Experience with a relatively small group suggests that if this precaution is observed, even multiple pregnancies are tolerated without reactivation of the tuberculosis. To detect

tuberculosis, each obstetrical patient should have a chest x-ray film examination as soon as pregnancy has been discovered. When tuberculosis is found in a pregnant woman, antibiotics and rest should be started at once precisely as during the nongravid state. Other methods of therapy should be added as needed. The patient may truthfully be reassured that, with adequate therapy, she will continue to improve despite the pregnancy, may be delivered of a normal child by the same maneuvers that would be used if she did not have tuberculosis, and will be noninfectious by the time of confinement. (Jacobs, S., Tuberculosis and Pregnancy: Dis. Chest, XXX: 43-48, July 1956)

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Results of Radiotherapy of Bronchial Cancer

The rise in bronchial carcinoma deaths in the last two decades suggests that the place of radiotherapy in the treatment of this disease should again be reviewed. It is estimated by one observer that about 2% of males now living will have bronchial cancer.

The most effective curative treatment for carcinoma of the lung remains resection, simple or radical, depending on the stage and type of disease and the condition of the patient. The proportion of patients eligible for curative resection remains relatively small, however, ranging from about 20% of those having symptoms to about 40% of those without. The latter largely represent x-ray survey-detected cases. Between 60 and 80% of persons with bronchial cancer, therefore, are still not amenable to curative surgery at the time their tumor is diagnosed. The results of radiotherapy in a series of patients in this group were considered.

After diagnosis, the average survival time of patients with bronchogenic carcinoma (treated or untreated) is considerably shorter than many clinicians appear to realize. The occasional patient who shows a long survival, either spontaneous or related to treatment, tends to remain uppermost in the mind.

Of 100 selected patients with bronchogenic carcinoma, about one-half are inoperable at time of diagnosis and one-half are eligible for exploration. Of the latter, about one-half will prove to be inoperable and the other half resectable. Of the 25 resected patients, 1 will usually die as a result of surgery, at least 16 will die of cancer, and possibly 8 will survive for 5 years (that is, 33% of the resected group).

Judging by the authors' experience and that of many others whose work is mentioned in this article, the average survival time after diagnosis of the 75 inoperable patients will be from 3 to 6 months. A small group of biologically favorable or radiosensitive cases (perhaps 10% of the inoperable group) will show relatively longer survival, amounting in a few instances to several

years. The chance of such increased survival is augmented by moderate-dose radiotherapy to the tumor and regional nodes. Even when survival time is not prolonged, the patient is usually made more comfortable by this treatment.

In view of the short average survival time of patients with inoperable bronchogenic carcinoma, the questions arise: Should these patients be subjected to radiotherapy at all? Would they not be more comfortable with simple medical measures? On the basis of the authors' experience, the following answer seems warranted: Most cases will benefit at least psychologically from judicious radiotherapy; in many, symptoms will be relieved; in a few, survival will be increased.

Radiotherapy in moderately heavy dosage (about 3000 r tumor dose in 4 weeks or less) has a useful place in the palliative treatment of bronchogenic carcinoma. In heavy dosage (about 5000 r tumor dose in 4 to 5 weeks), it is occasionally curative.

In a series of 122 cases of bronchogenic carcinoma (81 hospital cases and 41 private cases) treated by roentgen therapy alone, the average survival time after treatment was 6.2 months, the range being from 1 to 60 months. This average survival time was about 3 months longer than the average in a series of untreated cases.

Relief of symptoms for a period of weeks or months was obtained in approximately two-thirds of the treated cases, but marked improvement developed in only about 20% of the patients.

Results were slightly better in patients with anaplastic tumors than in those with squamous-cell growths. The response to radiotherapy, however, was not predictable on histologic grounds; some of the well-differentiated squamous-cell lesions responded better than some of the anaplastic tumors.

Judging from the reports of megavoltage and betatron therapy to date, the results of orthovoltage therapy (200 to 250 kv) for bronchial cancer, using the technique outlined in this article, are of about the same order of effectiveness.

These facts suggest that greater use should be made of generally available orthovoltage roentgen therapy in the care and treatment of inoperable bronchogenic carcinoma today. (Garland, L. H., Sisson, M. A., Results of Radiotherapy of Bronchial Cancer: Radiology, 67: 48-61, July 1956)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U.S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

Biological Effects of Atomic Radiation - A Report to the Public

In the peacetime development of atomic energy, it is generally agreed that man has been lucky. He has been dealing with an enormous source of power the potential effects of which he has only dimly understood. Thus far, except for some tragic accidents affecting small numbers of people, the biological damage from peacetime activities (including the testing of atomic weapons) has been essentially negligible. Furthermore, it appears that radiation problems, if they are met intelligently and vigilantly, need not stand in the way of the large-scale development of atomic energy.

In 1955, Detlev W. Bronk, President of the National Academy of Sciences, appointed a group of scientists to investigate the effects of high energy radiation on living things. The study was divided into six (6) parts, each assigned to a separate committee. The areas under consideration were:

Genetics	Meteorology
Pathology	Oceanography and fisheries
Agriculture and food supplies	Disposal of radioactive materials

The present report summarizes the findings to date. The problems of radiation fall naturally into two main classes: effects on human beings; and various ways in which radiation can reach human beings through environment.

Effects on Humans

Any radiation which reaches the reproductive cells causes mutations that are passed on to succeeding generations. Everyone is subjected to the natural background radiation which causes an unavoidable quantity of so-called spontaneous mutations. Anything that adds radiation to this naturally occurring background rate causes further mutations and is genetically harmful.

At present, the population of the United States is exposed to radiation from (1) the natural background, (2) medical and dental x-rays, and (3) fallout from atomic weapons testing. The 30-year dose to the gonads received by the average person from each of these sources is estimated as follows:

(1) Background: about 4.3 roentgens
(2) X-rays and fluoroscopy: about 3 roentgens
(3) Weapons tests: if continued at the rate of the past five years, would give a probable 30-year dose of about 0.1 roentgens. This figure may be off by a factor of five.

Environment and Food Supply

Radiation in the general environment has not yet become a serious problem, but it will inevitably contaminate man's food supply. The maximum tolerable level is not known.

Research has indicated some apparently feasible systems for controlled disposal, but none is yet at the point of economic operating reality.

Recommendations

The genetics committee has made a number of recommendations which apply most directly to all:

1. Records should be kept for every individual showing his total accumulated lifetime exposure to radiation.
2. The medical use of x-ray should be reduced as much as is consistent with medical necessity.
3. The average exposure of the population's reproductive cells to radiation above the natural background should be limited to ten (10) roentgens from conception to age 30.
4. The 10-roentgen limit should be reconsidered periodically with a view to keeping the reproductive cell exposure at the lowest practicable level.
5. Individual persons should not receive a total accumulated dose to the reproductive cells of more than 50 roentgens up to age 30, and not more than 50 roentgens additional up to age 40.

(Other recommendations of general interest follow:)

6. Techniques for monitoring worldwide fall-out should be further improved.
7. Until advances in reactor technology substantially reduce potential hazards, buildings that house reactors located near populated areas should be sealed against the release of radioactive materials in the event of accident.
8. Research should be continued and accelerated, particularly in the following fields:

   Fundamental genetics, mammalian genetics, human and population genetics
   Pathological effects of radiation
   Tolerable levels of radioactivity in human and animal food
   Selection of biologically suitable sites for various atomic facilities

(The Biological Effects of Atomic Radiation: National Academy of Sciences, National Research Council, Washington, D. C., June 1956)

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NOTES

PERSONNEL — PROFESSIONAL

Career Incentive Program

At this time, the ultimate impact of the career incentive program cannot be evaluated as the full effect will probably be realized only after a period of years. There are, however, even now some definite and significant factors that are sufficient to indicate a trend which must be attributed to the program. The following evidences of increased attractiveness of the Navy Medical Corps may be noted:

a. Increased participation in the Navy's residency training program: By 1 October 1956, when those now approved for training have reported, we expect to have 337 doctors in residency training. This compares with 116 at the end of Fiscal Year 1955 and 135 at the end of Fiscal Year 1954. The increased popularity of the program must stem from a wider appreciation of the value of training in the Navy and of the advantages of duty in the Navy subsequent to training.

	Medical Officers in Residency Training	Percent of Active Duty Strength
30 June 1954	135	3.9%
30 June 1955	116	3.4%
30 June 1956	185	5.4%
(Prospective) 1 Oct 1956	337	10.0%

b. Decreased resignations from the regular corps: The seriously high resignation rate of recent years has dropped significantly.

	Resignations	Percent of USN on Duty
Fiscal Year 1954	143	10.3%
Fiscal Year 1955	151	12.4%
Fiscal Year 1956	58	5.2%

It is of interest that two doctors whose resignations had been approved requested cancellation and have remained in the regular service.

c. Increased procurement for Regular Medical Corps: The number of doctors coming into the Regular Navy is not yet sufficient to materially affect our dependence on reserves coming to active duty through various channels, including the RCA Program and selective service. The increase in procurement rate, however, is highly encouraging. It indicates a reversal of the previous trend, as shown by the following figures:

	USN Accessions	Percent of USN Strength
Fiscal Year 1954	26	1.8%
Fiscal Year 1955	13	1;2%
Fiscal Year 1956	72	6.5%
Additional applications pending, 30 June 1956	104	9.4%

Another encouraging feature is that three former USN doctors who had resigned have reobtained USN commissions and are now on active duty; and a number of inquiries from other former USN medical officers have been received. Some of these will doubtlessly seek to regain their USN commissions.

d. An area in which the effects of the career incentive program are definitely apparent, but cannot be measured numerically, is the improved attitude toward naval service on the part of doctors now on active duty. This has been manifested through comments in letters and visits to the Bureau, which reflect widespread appreciation of the increased attractiveness of a career in navy medicine.

(Intra-Bureau Memo, 27 July 1956)

The Thoracic Surgery Training Program at the Naval Hospital, San Diego, Calif., has recently been approved for two years of training. CAPT H. D. Warden MC USN and CDR J. A. Kaufman MC USN have been assigned as residents in this program.

The School of Aviation Medicine, Pensacola, Fla., has been conditionally approved for two years of training in Aviation Medicine. LCDR D. P. Morris MC USN has been assigned to this program.

A Seminar on Obstetrics and Gynecology for the Armed Forces will be conducted at the Naval Hospital, Oakland, Calif., during May 1957.

The Dermatology Service, San Diego Naval Hospital, through affiliation with the University of Southern California, has now received approval for the full three years of training required by the American Board.

The Course in Radioactive Isotopes, Naval Hospital, Bethesda, Md., has been made available to residents in Radiology and to radiologists in order for them to meet the new requirements of the American Board of Radiology.

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Surgeon General's Symposium Deferred

The Symposium of the Surgeon General, planned coincident with the meeting of the Association of Military Surgeons in November 1956, has been deferred until January 1957. The exact date of the Symposium will be promulgated at a later date. (Bureau of Medicine and Surgery)

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From the Note Book

1. ATTENTION ALL HANDS: An incident occurred recently in the delivery room of a naval hospital which is most important to all ships and medical activites having the large, overhead operating room or delivery room lights.

Apparently, without cause, the light became detached from its base and fell. Fortunately, the patient on the delivery table below the light received only superficial skin abrasions.

Examination of the light fixture showed that the "lock pin" which should have been inserted through a threaded bushing and threaded pipe nipple, was missing. The two pieces had become unscrewed and in separating, the light fell. The equipment is so designed and constructed that, once the pin is placed in the hole provided and the unit assembled, the pin cannot of its own come out.

It is suggested that medical officers attached to ships and medical activities having this type of lighting equipment check immediately to insure that it is safely secured. (Pers & Prof Op)

2. The President, on August 1, 1956, approved the report of the selection board which recommended Captain F. P. Gilmore, MC USN, for promotion to the rank of Rear Admiral. (TIO, BuMed)

3. Ceremonies inaugurating the establishment of the U.S. Naval Medical Research Unit No. 2 at Taipei, Taiwan (Formosa), were held on June 22, 1956, and attended by distinguished Far East Diplomats, scientists, medical personnel and government representatives of free China. (TIO, BuMed)

4. A combined Armed Forces Medical-Dental Military Symposium will be held at the U.S. Naval Hospital, Great Lakes, Ill., September 26-28, 1956. (TIO, BuMed)

5. Captain R. F. Huebsch, DC USN, has been extended an invitation to Fellowship in the American College of Dentists by the Board of Regents of that College. (USNH, Philadelphia)

6. In the past year, members of the staff of AFIP contributed 47 articles to the medical literature, wrote chapters for 2 medical textbooks, and authored 4 newly published medical books. During the year a total of 92 residents, fellows, and students spent varying periods of time in resident study. Six postgraduate short courses were given; the total enrollment being 589 persons from the following sources: 275 from the Armed Forces Medical Departments, 63 from other Federal agencies, and 251 from civilian medical institutions. (AFIP)

7. A Medical Scholarship has been established for former Navy Hospital Corpsmen at the University of Southern California, sponsored by the Robert E. and May R. Wright Foundation, the scholarship is to be administered through a separate permanent endowment fund. Income from the Fund will aid students of the Southern California University School of Medicine who (1) have served with a rating of Hospital Corpsman Second Class or better and been discharged honorably, (2) are of an age at expected date of graduation of 21-33 years, (3) have established mental, moral, and professional fitness officer-like qualities, and aptitude for naval service, (4) meet appropriate physical standards, and (5) agree to apply for a commission and pass Medical College Admission Tests. (TIO, BuMed)

8. Small pox is still prevalent throughout the world. At least 400,000 cases are estimated to occur annually, chiefly in Asia, Africa, and Central and South America. The mortality mostly ranges from 30 to 60%. The complications that may occur and their treatment are discussed in J. Pediat., August 1956; R. Lundsröm, M.D., Stockholm.

9. Cases selected from a large experience with intracardiac surgery for acquired heart disease are presented to illustrate some of the problems of anesthesia. The common denominator was that as a group these patients were poorer risks than are generally accepted for surgery. In this type of case, any dereliction in anesthetic technique or any harmful characteristic of the anesthetic produced exaggerated responses or fatal issue. (New England J. Med., 19 July 1956; L.D. Van Dam, M.D., T.K. Burnap, M.D.)

10. Gitalin, a water soluble, amorphous mixture of glycosides extrable from Digitalis Purpurea, possesses an unusually wide therapeutic range.

The authors have used this drug successfully in the treatment of congestive heart failure of 77 patients with an average age of 78.4 years. (Am. Heart J., August 1956; R. Harris, M.D., R.R. Del Giacco, M.D.)

11. A review of 16 cases of pseudomembranous enterocolitis was made with a discussion of the etiology, prevention, and treatment of this disease. (Ann. Surg., July 1956; R.E. Weismann, M.D., E.B. Twitchell, M.D.)

12. The roentgenographic findings of Cushing's Disease are presented. Various manifestations of osteoporosis involving the entire skeleton and soft tissue changes of the major organs are evaluated. (Radiology, July 1956; C.C. Wang, M.D., L.L. Robbins, M.D.)

13. The clinical features of Fox-Fordyce disease constitute a distinct picture. The findings of a symmetric eruption of discrete, flesh colored to pink papules oriented about the follicular openings with intervening normal skin and located in the axillae and about the external genitalia, the areolae, and the umbilicus and with the overwhelming predominance in sexually active females, with the pruritis accompanying it, distinguish this condition clearly. (Arch. Dermat., July 1956; R.K. Winkelmann, M.D., H. Montgomery, M.D.)

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The Navy Diving Manual

The Navy Diving Manual is a publication of the Bureau of Ships (Nav-Ships 250-880). It is obtainable through District Publication Offices for those activities authorized to conduct diving. This issue of the Manual, dated 1 July 1952, supersedes the 1943 edition and supplements Chapter 94 (Salvage), Section II (Diving) of Bureau of Ships Manual. Personal copies may be obtained from Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C., at a price of $1.25.

It is only fair to point out that the Manual is in the process of revision at the present time. The preliminary draft of the portion concerning diving with self-contained underwater breathing apparatus is ready. It is hoped this will go to the printers within a couple of months. Work will begin next on the section concerning the general principles of diving physics, and physiology.

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The printing of this publication has been approved by the Director of the Bureau of the Budget, 16 May 1955.

* * * * * *

Board Certifications

American Board of Internal Medicine

LT Gerald L. Baum MC USNR (Inactive)
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DENTAL SECTION

Tours of Sea Duty for Dental Officers

The Medical News Letter, Volume 27, Number 11, 8 June 1956, in an article entitled "Career Incentives" noted that certain administrative actions in relation to legislative actions had been taken to improve career attractiveness for medical and dental officers. One of the actions listed was the reduction of tours of sea duty for Medical officers to 12 months. This 12 months tour of sea duty applies only to medical officers and does not apply to dental officers. The length of tours of sea duty for dental officers is 24 months.

* * * * * *

Dental Corps Passes 800 Mark in "Operation Build-Up"

The strength of the U.S. Navy Dental Corps reached 805 on 31 July 1956. This marks an increase of 106 dental officers since 9 July 1954, when the Corps numbered 600. This encouraging increase is an important step in carrying out the intent of the Medical and Dental Officers Procurement Act of 1956, to raise the strength of the Regular Corps to two-thirds of the authorized allowance. It is also evidence of early success in the U.S. Navy Dental Corps "Operation Build-Up" which was initiated to acquaint qualified civilian dentists and Reserve dental officers with the opportunities and advantages of careers in the Regular Navy.

* * * * * *

Reserve Retirement Points for Dental-Military Seminar

The Chief of Naval Personnel has approved crediting one retirement point to Naval Reserve Dental Officers for each of the three sessions attended at the Dental Military Seminar to be held 1-4 October 1956, at Atlantic City in conjunction with the 97th Annual Session of the American Dental Association.

Attendance of this seminar has been approved as appropriate duty for Naval Reserve Dental Officers attending.

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Highlights of the Marine Corps Dental Program

Force Dental Companies were activated by the Commandant of the Marine Corps during the past fiscal year. The new organizational structure provides the Fleet Marine Force with a flexible, highly mobile dental service, capable of meeting the treatment requirements of the varied types of Marine Corps operations. A policy document to furnish guidelines for the dental companies was approved 15 June 1956.

Field Dental Trailers. The addition of steel brackets and supports to the surgical trailer has converted this standard Marine Corps item to a dual purpose vehicle. The minor alterations effected will in no way interfere with the surgical use of the trailer, but will enable it to be used for dental operations.

Standard Equipment Use. Fleet Marine Force units in the field in occupation status may now requisition standard dental operating equipment, providing facilities that will permit installation are at hand.

Inspections. Agreement has been reached whereby the dental officer on the special staff of the Commandant of the Marine Corps will conduct the inspection of the dental activities attached to the Marine Corps Supporting Establishment. Dental officers on the special staffs of the Commanding Generals, Fleet Marine Force, Atlantic and Pacific, will conduct the inspection of dental activities attached to their respective Force.

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Ocular Prosthesis

The custom-built and individually constructed acrylic resin artificial eye has proved to be the most esthetic and satisfactory ocular replacement. The custom eye, however, requires the services of a skilled artist for reproducing the iris and sclera with paints. A satisfactory prosthesis may be developed by using a stock acrylic eye purchased from a commercial optical company and "customizing" the posterior portion to the individual by means of an impression and reprocessing technique.

The adaptation may be accomplished without the aid of an artist or person skilled in iridal and scleral painting; it may be fabricated rapidly and positioned to serve the patient as a comfortable and esthetic prosthesis while he is waiting for his custom-build ocular prosthesis; and it may be constructed with materials and equipment normally found in any dental office and laboratory. (Welden, R. B., and Niiranen, J. V., Ocular Prosthesis: Journal of Prosthetic Dentistry, 6:272-278, March 1956)

MEDICAL RESERVE SECTION

Senior Medical Students Selected for Fiscal Year 1957

Selected Senior students, enrolled in medical schools throughout the United States, will soon enter on active duty as Ensigns 1995, U.S. Naval Reserve, as participants in the Navy's Senior Medical Student Program. These students will receive the full pay and allowances of their rank while so enrolled on active duty and upon completion of medical school and internship, these officers will receive commissions in the medical corps of the regular Navy. Their names and schools are:

Medical College of Alabama
William A. Royer

Albany Medical College
Wilbur C. Rust

Univ. of Arkansas School of Medicine
John W. Balay
O'Tar T. Norwood

Baylor Univ. College of Medicine
Robert F. Anderson
Terry M. Collier
Frederick J. Cremona
John R. Finch

Boston Univ. School of Medicine
Robert F. Baker
Maurice H. Connors
Charles M. Gluck

Univ. of British Columbia Medical School
John B. Burr
Maynard S. Christian
Theodore J. Cosgrove

Univ. of Buffalo School of Medicine
Thomas P. Hamilton

Univ. of California School of Medicine
Thomas L. Thomason
Peter F. VanPeenen

Univ. of Southern California School of Medicine
Roger G Hauser
Kenneth E. Wagner

Univ. of Cincinnati College of Medicine
Allen Litwin

Univ. of Colorado School of Medicine
Byron L Beddo
Jack A. Langevin

Columbia Univ. College of Physicians and Surgeons
John S. Davis
Anthony Dede

Creighton Univ. School of Medicine
Fred J. Svendsen

Duke Univ. School of Medicine
Elbert L. Fisher
Dingess M. Givens
Richard L. Rogers

Emory Univ. School of Medicine
Richard K. Cureton

Georgetown Univ. School of Medicine
Albert J. Loew
James J. McHale
Richard E. Menzel
Ross B. Moquin
Roscoe A. Rossi
Philip J. Torsney

Medical College of Georgia
Robert H. Moreland

George Washington Univ. School of Medicine
William V. Applegate
John A. Arness
Vernon H. Balster
Jere J. Daum
Bruce K. Defiebre
Ralph Jacobsen
George F. Sengstack
Ronald H. Woody

Hahnemann Medical College and Hospital of Philadelphia
Robert S. Mandell
Sidney Tolchin
Gerald Weitzman

Harvard Medical School
Benjamin J. Gilson
Roger H. Morris

Howard Univ. College of Medicine
Alvin A. Shackner
Jose C.S. Smith

Univ. of Illinois College of Medicine
Eldon L Evans

State Univ. of Iowa College of Medicine
Harold E. Bergee
Charles E. Boylan
Stephen H. James
Francis L. Klingle
Donald R. Miles

Jefferson Medical College of Philadelphia
Robert S. Boring
Frank S. Bryan
John E. Hester
Stephen J. Kendra
Elmer H. Witthoff

Univ of Kansas School of Medicine
Albert L. Folkner

Louisiana State Univ. School of Medicine
Howard Alleman
Ronald L. Bouterie

Stritch School of Medicine of Loyola Univ.
John B. Oldershaw

Marquette Univ. School of Medicine
John H. Beaumier

Univ. of Maryland School of Medicine and College of Physicians and Surgeons
Ronald R. Cameron
Nicolas A. Garcia
Donald T. Lansinger
Ke nneth F. Spence

College of Medical Evangelists
Harold R. Hunt
Edward J. Sheldon
Walter L. Taylor

Univ. of Miami School of Medicine
William C. Douglas

Univ. of Michigan Medical School
John P. Cannon
James J. Chandler
Arnold D. Hoekzema
Edward W. Klein

Univ. of Mississippi School of Medicine
Fred S. Evans
Ralph M. Fortenberry
William B. White

New York Medical College
Alfred R. Chappelka
Michael F. Dolan
Robert Littlejohn
Guy A. Settipane

Univ. of North Carolina School of Medicine
James W. Fresh
James B. Glover

Northwestern Univ. Medical School
Paul R. Cekan

Ohio State Univ. College of Medicine
William J. Fouty
John L. Kuehn
Darrell J. Smith
Robert A. Williams

Univ. of Ottawa Faculty of Medicine
Allyn E. Gilbert

Univ. of Oregon Medical School
Edwin P. Gramlich
Daniel V. Voiss
David L. Williams

Univ. of Pennsylvania School of Medicine
George J. McMahon
Monroe E. Trout

Univ. of Puerto Rico School of Medicine
Rafael Fernandez-Feliberti
Ives C. Thillet

Univ. of Rochester School of Medicine and Dentistry
George A. Whipple

Medical College of South Carolina
Christopher H. Biser
George E. P. Buxton
Jim F. Hicks
Josiah S. Matthews
Welbourne A. White

Southwestern Medical School, Univ. of Texas
Johnny E. Milner
Earl M. Olmstead

Stanford Univ. School of Medicine
Edmonston F. Coil

Temple Univ. School of Medicine
James J. Biemer
Donald H Greene
Jon K. Hillis
Charles V. Kachel

Univ. of Tennessee College of Medicine
David M. O'Neal
Andrew M. Pardue

Univ. of Texas School of Medicine
Gilbert I. Madison
George E. Metz
Andrew Olesijuk

Tufts College Medical School
Arthur O. Anctil
William J. Baker

Tufts College Medical School
(continued)
Thomas M. Kennedy
Raymond E. Merrill
Alfred C. Moon
Raymond S. Riley
Joseph L. Sirois
Lawrence Sweeney

Tulane Univ. of Louisiana School of Medicine
Stanley R. Payne
Ellsworth J. Sacks
James F. Walker
George H. Wood

Univ. of Utah School of Medicine
Dell J. Barker
James E. Hansen

Univ. of Vermont College of Medicine
Howard S. Irons
Philip B. Kaplan
Denton E. MacCarty
Edward J. Quinlan

Univ. of Virginia School of Medicine
Donald R. Cagle
George A. Ferre
James T. Gillespie
William L. Meehan
Bruce A. Talmadge

Medical College of Virginia
Burness F. Ansell
William N. Fender
Murray G. Mitts
Alvin J. Southworth

Univ. of Washington School of Medicine
Fred L. Benoit
Stanley D. Harmon
Jude R. Hayes
Willard A. E. Larson
Donald M. Roser
James B. Wade
Ray A. Dubeau

Western Reserve Univ. School of Medicine
Harold A. Rosene

Univ. of Wisconsin Medical School
Donald M. Kinkel

The Senior Medical Student Program is open to qualified students enrolled at medical schools accredited by the Council on Medical Education and Hospitals of the American Medical Association. Students who have completed their second year of medical school may make application for this training at any Office of Naval Officer Procurement. Active duty commences and continues while in attendance during their senior academic year. To be eligible for participation, the student must be an Ensign 1995 (Medical), U.S. Naval Reserve, or agree to accept such an appointment if selected. A board convened in the Bureau of Medicine and Surgery selects the candidates for participation in this program. Timing is very important, an average of 4 months is required to completely process each application. February 1, 1957 is the absolute deadline that completed applications must be forwarded to the Bureau of Personnel, Department of the Navy, Washington 25, D. C., for those desiring to participate in this training during fiscal year 1958.

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SUBMARINE MEDICINE SECTION

Diving Casualty Case Studies

"Only 30 feet of water!" These represent some of the saddest words ever heard by a doctor treating diving casualties. The rapid growth of interest in shallow water diving, either with an air supplied mask or a self-contained underwater breathing apparatus, is bringing its toll of casualties. To the doctor untrained in treating diving casualties, many of these appear to be drownings or sudden deaths for unexplained reasons. An attempt will be made to explain by the case study method some facets of handling diving casualties.

Case No. 1

This diver made two dives to 35 feet within an elapsed time of 35 minutes, using the shallow water mask and air supplied from shipboard. When he surfaced from the last dive, he was nauseated, vomiting, spitting up frothy blood, and complained of a "constriction in my chest." Within 5 minutes after surfacing he was in the ship's sick bay where physical examination by a medical officer was essentially negative. He was kept in bed overnight. The next morning he went to a small vessel nearby (equipped for diving) where he reported his condition. The diver hospital corpsman and the diving officer (line) of this vessel believed the man had an air embolism, so, with the commanding officer's permission, started treatment, using Treatment Table III almost 15 hours after the patient surfaced from his second dive with all symptoms present.

When the patient had been compressed to a depth of 60 feet, he was relieved of all chest pain. After gradual decompression according to Treatment Table III (which takes 19 hours), the patient was observed in bed for a 24-hour period. The relief of pain was complete. Other symptoms were relieved. Result: Cure.

Case No. 2

A student diver at a second class diving school was making his first dive using the shallow water mask. The water depth was approximately

35 feet. A few minutes after he reached the bottom, he failed to answer signals given on the lifeline. He was promptly hauled in and when brought to the surface arrived with the head slightly dependent. The face mask was still bubbling air, but was off his face. During the efforts to bring the unconscious diver aboard, the lifeline broke and the diver fell back to the bottom. A diver-instructor donned the same mask and recovered the body on the second try, estimated within a matter of 5-7 minutes. Assistance had rallied in the meantime. When the body was brought onto the diving barge, first-aid efforts, using a respirator and intra-cardiac medication, were administered with the patient on his back. During the time the body was at the surface prior to the lifeline breaking, it was noted that bloody froth was coming from the patient's nose and mouth. Result: Death.

Discussion

Breathing compressed air at any depth always has an associated potential hazard. If a person holds the breath and comes to the surface from 33 feet depth, the volume of the air in the respiratory tract is doubled. The exact mechanism of air embolism is still in debate. It has been thought that an air embolism occurs only when two conditions exist: (a) the lung alveoli are completely distended, and (b) the differential pressure on the lung tissue exceeds its tensile strength. From this, it will be seen that a combination of circumstances have to exist to cause lung damage. But this is not as rare an event as one might think. How air gets from the alveoli into the vessel bed may be debated. It is probable that mediastinal emphysema is a much more common result. Certainly, a bloody frothy sputum in a diver just after a dive suggests lung damage to a doctor trained in diving casualties. This fits both cases. Why it should happen in Case No. 1 is not easy to explain. The diver probably held his breath while surfacing although he knew better and was not conscious of doing so at the time. In Case No. 2 other evidence, not mentioned before, suggests that the diver became panic stricken and tried to get out of his rig. Perhaps he held his breath and tried to swim to the surface. Recompression was the appropriate treatment for this condition. Case No. 2 calls for a review of first aid measures in drowning. It would appear that dependent drainage with the patient on his belly would be appropriate. If a recompression chamber is immediately at hand, resuscitation efforts should be undertaken in the chamber so the patient can be treated for the diving casualty at the same time efforts at resuscitation are made. Only the diver doctor, who has seen the seemingly moribund hopeless casualty become conscious and regain his faculties during recompression, can fully appreciate the importance of this form of treatment.

Case No. 3 - The Yo-Yo Diver

A scallop diver went to 115 feet for 30 minutes. Four hours later he repeated the dive. On each dive he received 6-8 minutes decompression. (U.S. Navy Tables and current practice call for 12 minutes at 10 feet for decompression for the first dive and 14 minutes at 30 feet, 27 minutes at 20 feet, and 37 minutes at 10 feet for decompression for the second dive.) When the diver surfaced from the second dive, he reported a "burning" in his right shoulder. Several minutes later he had pain in his lower back and had difficulty in standing upright. His arms began to hurt.

His tenders dressed him again and sent him back to the bottom (115 feet) for recompression. This did give relief for the pain in his arms and partial relief of the other symptoms. After a couple of minutes, he was brought slowly to the surface. The time in the water for this dive is not known. Shortly after reaching the surface this time, he had severe pain in his arms, legs, and back.

He was put in the water for the fourth time and lowered to 40 feet for 2 hours. On his return to the surface from this dive his legs became completely paralyzed.

He was then lowered to 15 feet for 15 hours during which period both arms became paralyzed.

The next day he was put in the water twice to the bottom (115 feet) for 2 hours each time.

After these seven dives, two for work and five for treatment, he was brought to the Navy for treatment. The patient arrived by helicopter. Examination indicated total absence of reflexes in arms, legs, and torso. His neck was stiff. He could move his eyes and open his mouth, but could not talk. His expression suggested extreme pain.

Recompression in a chamber was started. As the pressure depth increased, the pain seemed to subside. He was recompressed to 165 feet in 8 minutes. Five minutes later—11 minutes after starting treatment in the chamber—the first reflexes returned to his left leg. Shortly after, he could move his arms. Two hours after starting the treatment (Navy Table IV), reflex action was present in both legs. Despite the fact he had not completely recovered from all symptoms, the ascent was begun according to schedule. During the ascent, all symptoms gradually subsided in intensity. Feeling returned to the torso beginning at the breast level and spreading downward.

In the meantime, a jury rig for administering helium-oxygen mixture was set up. During the 40-foot stop, the patient was started on helium-oxygen. This was given for 1-hour periods alternated with 1-hour breathing air. Within 40 minutes on helium-oxygen there was a marked improvement. During the decompression the patient received a total of 5 hours of helium-oxygen. Pure oxygen was not used because of the poor

condition of the electrical wiring in the chamber. After 38 and 1/4 hours the patient was at the surface on schedule. He was unable to walk, but had feeling and reflexes in both legs and feet. Feeling had returned over the torso except for the lower two inches of abdomen. Result: Excellent response to treatment, but incomplete recovery.

Discussion

This case illustrates many deviations from Navy standard diving procedure. The author takes them up chronologically for ease in referring to the case report.

1. The decompression for the first dive was inadequate by Navy standards.

2. The second dive, 4 hours after the first, should have received decompression based on the total bottom time for both dives according to standard procedure. The reason is that divers can be surfaced in a state of supersaturation if the safe surfacing ratios are not exceeded. However, there is no assurance that their "slow tissues" are completely desaturated before they make another dive the same day. The current standard procedure may be overly cautious in requiring such long decompression for the second dive, but this case illustrates why caution is indicated. The matter of repetitive dives is very important in the rapidly growing sport of underwater swimming. More than one deep dive per day stacks the cards against the diver. The USN Experimental Diving Unit at the Naval Gun Factory is currently working on a set of tables for repetitive dives, but they are far from being ready for field use.

3. When the man was sent back to the bottom the third time because of pain in the arms, legs, and back, the idea of decompression in the water was a correct move. The depth, 105 feet, gave partial relief. Had the water been deeper, he should have been lowered to 165 feet. Treatment Tables do not call for depths greater than 165 feet because the further increase of pressure does not produce a relatively great reduction in the diameter of a spherical bubble.

A rule of treating diving casualties is never less than 100 feet for 30 minutes and then, come to the surface according to Table I, even in the most trivial case. This helps reduce the incidence of recurrences. Here, even this simple rule was violated and the golden moment of opportunity passed. The diver received inadequate recompression for treatment. On surfacing, he had a severe case of compressed air disease (bends with paralysis).

4. The symptoms presented by the situation following the third "dunking" indicated treatment by Table III at least, preferably Table IV. In this case, the diver was lowered the fourth time to 40 feet and left for 2 hours. When

this failed to relieve him, a fifth try was made at 15 feet for 15 hours. The next day, two more attempts were made sending the diver to 115 feet for 2 hours each time.

The first faulty decision was made on the third dive when the man was improving at 115 feet and they did not keep him there longer. From then onward, the treatment was simply a floundering about without plan. The result was quadriplegia.

Never try to treat a diving casualty with the decompression table for a dive. The diving decompression tables are planned to not allow the supersaturation of the tissues to exceed the critical ratio and, thus, avoid the formation of a bubble. Once the bubble is formed, more pressure for longer times is required while it passes back into solution. After the bubble is back in solution the patient must be decompressed from a state of supersaturation that is close to the critical ratio. Hence, decompression for treatment will always be longer than decompression for a dive.

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AVIATION MEDICINE SECTION

Toxicology Studies in Unexplained Aircraft Accidents

The Director of the Armed Forces Institute of Pathology has announced that the Institute is prepared to receive material for special toxicological studies which were generally unavailable in the past: namely, post-mortem tissue carbon monoxide and post-mortem tissue lactic acid (for antemortem hypoxia) determinations.

A most thorough aeromedical investigation is required in the event of a fatal aircraft accident in current high performance aircraft. In many instances, the only remaining evidence is inadequate for an autopsy in the usual sense of the word. Hence, toxicological tests on tissue fragments may be the only source of information on possible incapacitating factors affecting the pilot. Whenever hypoxia or carbon monoxide is suspected, flight surgeons should take advantage of this new laboratory service.

It is emphasized that this service is distinct from that rendered by histopathology centers and the Armed Forces Institute of Pathology for processing autopsy material. The new OpNav Instruction 3750.6B requires that

medical officers make every effort to obtain autopsies on aircrew fatalities. BuMed Instruction 6510.2A states the manner in which the facilities of histopathology centers and the Armed Forces Institute of Pathology are to be used to the greatest advantage in this regard.

Facilities at the U.S. Naval Medical School, National Naval Medical Center, Bethesda, Md., continue to be available for routine toxicological studies. BuMed Instruction 6510.4A covers the services rendered by this facility for determinations of carbon monoxide in blood specimens. This laboratory is also equipped for studies on tissue specimens as outlined in BuMed Instruction 6510.3. Detailed instructions for the collection and shipping of specimens are contained in this latter reference. The laboratory at the Naval Medical School is not equipped to handle tissue for carbon monoxide and hypoxia studies. Such specimens should be shipped by air express, addressed as follows:

Director, Armed Forces Institute of Pathology
Washington 25, D. C.
Attention: Forensic Pathology Department (Aviation)
Rush - Tissue for Diagnosis

The addressee should be notified by telephone or wire of the estimated time of arrival of the tissue and the name of the carrier.

Although methods are described above for the handling of tissues for toxicological studies differently from autopsy material, it is emphasized that all such studies constitute a form of autopsy or post-mortem examination. If dissection of a body to obtain such specimens is contemplated, the Manual of the Medical Department, Paragraph 17-24, should be complied with.

The following suggestions are made with reference to the submission of specimens in order that the best results may be obtained. Proper equipment for collection of specimens should be assembled and ready for immediate use in the event of a fatal accident. No preservatives such as formalin should be used on specimens for toxicological studies. Specimens should be cooled as quickly as practicable and shipped in ice or dry ice packing sealed in airtight rubber bags (condom). Freezing is preferred where possible. In order to render valid conclusions from such studies, the laboratory should be supplied with complete data concerning the accident. Factors such as time of collection in relation to time of the crash, general state of the body (burn damage, contaminants, et cetera), and other pertinent facts should be submitted with the specimen. Samples from a variety of tissues greatly enhance the value of conclusions drawn from post-mortem analysis. Brain and cord tissue is the only type at present useful for lactic acid levels (hypoxia) and the validity of results is increased by the collection and freezing of the specimen no more than twenty (20) hours after death.

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Naval Aviators' Service Group Classification

BuPers Manual, Article C-7301(4) Revised, is currently effective and directs that changes be made in the service group classification of naval aviators. Service Group IA has been discontinued and there remain Service Groups I, II, and III as follows:

1. Service Group I is comprised of pilots under 50 years of age who meet the physical requirements of Service Group I.
2. Service Group II is comprised of pilots age 35 to 50, or those pilots under age 35 who have accumulated 10 or more years of active flying service since designation, who meet the physical standard for Service Group II, and pilots of Service Group I who temporarily meet only the physical standards of Service Group II.
3. Service Group III is comprised of pilots over 50 years of age, and those under age 50 who are recovering from illness or injury or who temporarily do not meet the standards for Standard Groups I or II.

Pilots assigned because of temporary physical defects shall be retained in Service Group III for a period up to 6 months at the end of which time they shall be reexamined for classification. Should the temporary disability warrant a longer period in order to fully recuperate, they can be retained in this group for additional 6-month periods before final classification is effected. Those pilots assigned for the needs of the service shall be retained in Service Group III for only as long as the need exists. Upon change of station, this need will be assumed to have terminated. The Chief of Naval Personnel will effect appropriate redesignation or reassignment to Service Group III as needs of the service then require.

The Manual of the Medical Department, Chapter 15, Section V, is in the process of being modified to conform to the requirements of the above BuPers Manual change.

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Postflight Reoccurrence of Reaction to Bends

Following is a narrative summary of a B-47 flight which is taken from the Air Force Physiological Training Program News Letter, No. 24 of June 1956.

On this flight, the co-pilot was flying as fourth crew member due to the presence of an IP aboard, and experienced what was believed to be grade III bends shortly after loss of pressurization.

At 0215 hours, the aircraft was flying at 37,000 feet with a cabin altitude of approximately 10,000 feet. At this time, cabin pressurization

was lost due to failure of seal at entrance hatch. The time required to completely lose cabin pressurization was approximately 2 seconds. The co-pilot (fourth man) had just returned from the gunner's station to his station in the aisleway and was about to reconnect his mask hose to the walk-around bottle. The bottle was several feet forward of his position at this time. The co-pilot stated that there was considerable difficulty in trying to carry the bottle to the gunner's station and back and, therefore, he had gone without it. He also stated that there was no D-2 regulator outlet for the fourth crew member on this aircraft and that it was not feasible for him to keep his bottle plugged in continuously to the recharger hose since these two items did not mate properly causing a gross leak. About 5 to 10 seconds elapsed before the bottle was reached and connected (A-6 bottle with A-21 regulator). During this period, he experienced a feeling of dizziness and blurred vision. The regulator was turned to the emergency setting and kept at this setting for approximately 10 seconds. Because of the difficulty in exhaling on this high pressure setting, the regulator was turned back to the 30M setting. The dizziness and blurred vision disappeared at this time.

At 0225 hours, the co-pilot (fourth man) noted a mild pain in following locations on his right side: shoulder, knee, elbow, and wrist. On onset, the pain was mild in intensity, but gradually increased to the point of being severe for approximately one and one-half hours.

At 0350 hours, the aircraft descended to 28,000 feet (still unpressurized) and continued at this altitude for the remainder of the flight. At this altitude, the pain decreased from severe to mild. At 0545 hours, descent for landing was started and on passing through 20,000 feet symptoms disappeared completely.

The aircraft landed at 0600 hours. Twenty minutes later, the original symptoms reappeared in the same locations as before. In several minutes, the pain became moderate in intensity and the crew member decided to go to his squadron operations—a distance of about one-half mile. Due to the lack of transportation, it was necessary for him to walk this distance and, while walking, the pain increased in intensity to the point of being severe. The crew member states that it was almost impossible for him to continue unassisted. Upon reaching squadron operations, he was taken by auto to the base hospital where he was seen by the flight surgeon. He further stated that the degree of pain remained severe during the first hour after admission to the hospital. The pain gradually subsided during the second hour of hospitalization. The patient was dismissed after 2 days and was completely asymptomatic at this time.

Emphasis should be placed on the importance of returning to ground level when any crew member experiences severe evolved gas dysbarisms, as well as the importance of requesting the tower to dispatch an ambulance to meet the aircraft so that the reactor can be properly cared for after landing.

Excerpts from Medical Officers' Reports

Case No. 1

An F2H-2 without chase plane was observed at 28, 000 feet altitude by a group of FJ's. The Banshee was seen to climb and dive alternately between 27, 000 and 22, 000 feet and to complete approximately 270 degrees of turn. The F2H then executed a nose down aileron roll followed by a split-S from an estimated altitude of 18, 000 feet. While diving, the F2H rolled slowly to the left twice before the FJ pilots lost sight of it below them. The aircraft was not observed to recover from that dive.

The flight surgeon writes: "Prior to the accident, the pilot was in apparent good health, physically and mentally qualified for flight duty. Three hundred and thirty-eight (338) of his total flight time of 695 hours were in jet type aircraft; however, only 4. 6 hours in the F2H-2. Two months previously he was transferred from a tactical squadron to the Headquarters and Maintenance Squadron. Consequently, his total flight time for these two months dropped to 4. 8 and 8. 6 hours respectively. Pilots assigned to desk jobs fly less regularly, attend fewer aeromedical lectures, and divide their limited flight time between two or more type aircraft which in itself lowers their basic familiarity level. With 4. 6 hours, a pilot cannot be considered thoroughly familiarized with this type, and in view of this fact, single plane missions appear less desirable. The indispensable value of an alert wingman was clearly demonstrated when this same pilot experienced an episode of hypoxia two months earlier due to malfunction of the exhalation valve. It is alarming that this pilot failed to have his mask cleaned and inspected for eleven weeks in spite of his previous experience. It was not observed that he extended his speed brakes at any time nor did he pull the firing pin mechanism as post-crash inspection revealed. It is presumed that the pilot was physically unable to effect a safe recovery. Thus, due to unfamiliarity with this type aircraft, hypoxia and possible preoccupation with the FJ flight may have played a role in the cause of this accident."

Case No. 2

It happened on Friday, the 13th (of April 1956) in an SNJ during a chase hop.

The pilot writes: ". . . . . my right shoe began to get hot as if the hot air duct adjacent to the right rudder pedal had turned to the open position. A quick check revealed that the duct was closed . . . no further attention was paid to the matter . . . . .

During the first turn of section cruise, I again noticed that my right foot was becoming unusually warm. An investigation revealed that the exit

chute for the upper 30 cal. nose gun had blown off the aircraft and exhaust gas was coming in through the open hole and striking my right rudder pedal.

I . . . elected to proceed with the flight . . . . .

I had had previous jet experience and had experienced mild cases of anoxia from time to time, and 'just in case' removed my left glove to keep a check on the color of my fingernails. I instructed the enlisted man in the rear seat to keep a close check on his and report to me any time he felt bad or showed any effects of the exhaust gas . . . . .

Approximately 30 minutes later . . . I began to notice a definite drowsiness on my part, that although my nails were not discolored, they were not as white as they had been, and that I didn't feel too well. My passenger in the back seat . . . also reported that his nails were changing and that he didn't feel too well . . . I departed the area . . . upon arriving in the pattern, it was quite congested . . . I came into the final rocking my wings violently to indicate no wave-off and was promptly given a wave-off by the RDO via radio which I did not take . . . I was taken direct to the flight line . . . to the field ambulance and to sick bay . . . . . "

The findings: Approximately 30-35% carboxyhemoglobin.

Case No. 3

The pilot was doing "slow time" in an AD4B prior to commencing FCLP's. The flight was at an altitude of 400 feet. A pilot in a following aircraft noticed that their interval was closing. Then the left wing and nose dropped somewhat and the plane rolled into a right and diving turn . . . the plane crashed.

The flight surgeon writes: "On the Friday prior to the accident, the pilot began to move into a new house. Saturday and Sunday morning he completed his moving . . . Monday morning he seemed very fatigued and made the statement, 'If I get through this hop, I've got it made.' He was pale and had a drawn face. The weekend was hot and humid and the pilot must have perspired greatly. Monday's weather was the same and he wore a sweat shirt under his flight suit to absorb the perspiration. He took off at noon and flew at 500 feet for about 15 minutes with his canopy apparently closed before he crashed . . . . . .

If there were any organic cause for this accident, I feel that salt depletion with heat exhaustion is the most likely. The pilot did a great deal of heavy work on the weekend prior to the crash. The climate was hot and humid. He did not, as far as we can ascertain, take salt tablets for sodium replacement. He took off at noon and flew with the canopy closed on a hot humid day, making the cockpit similar to a steam oven. With this, he may have suffered acute salt depletion in addition to the chronic depletion which probably occurred on the preceding weekend. Loss of consciousness and the fatal outcome could have followed."

Case No. 4. Wheeling and dealing . . . . .

Ensign X lowered the landing gear of his F9F-8 on the downwind leg . . . he overshot the runway and took a wave-off, leaving the gear and flaps down. . . . At the 180 degree position on his second approach, he called "turning base leg, landing gear down and locked," and requested a touch-and-go landing. The tower requested that he take it around again because an F2H was making a full stop landing ahead of him. Ensign X took a wave-off and proceeded to the break with the gear and flaps up. The runway wheel watch fired a flare at the F2H ahead of Ensign X; both pilots took a wave-off. The flare was fired by error. Ensign X reentered the pattern and informed the tower, "gear down and locked." He was instructed by the tower to make his approach, but to take a wave-off at 500 feet. Ensign X did this presumably with the gear and flaps down. He commenced his fourth approach and called at the 180 degree that gear was down and locked. The landing approach was normal. The duty runway watch saw that the gear was up and fired a flare. Ensign X did not see the flare, but did hear the tower tell him to go around again. His application of power was too late. Ensign X was not aware that the main gear was up.

Case No. 5. Amen!

LT (JG) Z took off in an F2H on a routine night FCLP hop. While on his sixth downwind leg, he reported 2200 pounds of fuel aboard. Shortly afterwards, he called Mayday and reported that both his engines had flamed out. The plane was landed straight ahead from an initial altitude of about 350 feet. It crashed into a forested swamp, passing through the trees, after initial contact in a somewhat nose-down, right wing-down attitude. After about 300 feet in the trees, the plane hit the marshy ground and continued another 300 feet before halting. The plane burst into flames immediately after coming to rest. The pilot, unable to open the canopy, ejected through it, coming to rest just aft of the right wing. As the plane burned, he removed parachute, Mae West, a helmet, and left the scene somewhat dazed and amnesic . . . . .

The fact that LT (JG) Z survived the ejection may be attributed to . . . the landing of the seat in very marshy, soft ground. Injuries: mild concussion, compression fracture of L3, mild lacerations, and abrasions. . .

* * * * * *

Training Films on High Intensity Noise Problems

Almost anyone will agree that for a number of years carrier flight decks have been becoming increasingly noisy. Each new aircraft engine

development has increased power output and has raised over all noise levels. The Department of the Navy is seriously concerned about the problem of these over all noise levels as related to aircraft operations and maintenance. Many scientists and engineers believe that present over all noise levels on carrier flight decks and on flight maintenance lines are at, or very near, the limit of human tolerance. Repeated research studies and operational surveys have indicated the seriousness of this problem and that there is no quick and easy solution. Surveys have shown that flight deck personnal are already sustaining hearing losses of both temporary and permanent nature.

In view of the nature of the physical damage that may be experienced by personnel, the Medical Department of the Navy and particularly Flight Surgeons serving aboard carriers and at aviation activities ashore are most intimately concerned in the solution of the high intensity noise problem and in the measures that must be used to safeguard personnel from the hazards involved. In regard to protection of personnel, there are two things that the Flight Surgeon can and should do at present. First, educate the personnel engaged in aircraft flight and maintenance operations in the hazards of high intensity noise. Second, assure adequate distribution, fitting, and use of noise protective devices among operating personnel. The training job of the Flight Surgeon has two phases: (1) the training of medical department personnel in their responsibilities for the prevention of unnecessary exposure of personnel to hazards of high intensity noise, and the methods and procedures to be used by the medical department to protect personnel; (2) training of operating personnel, not only in the hazards of high intensity noise, but also in the correct and proper use of noise protective devices.

In late 1953 and early 1954, the Bureau of Medicine and Surgery in cooperation with the Department of the Air Force and with the technical assistance of the Armed Forces - National Research Council, Committee on Hearing and Bio-Acoustics, initiated the production of three training films to assist the Flight Surgeon in the training of medical department and operating personnel in the problems related to high intensity noise. These films are now completed and available for use. A brief description of each follows:

1. MN-9318a: Medical Aspects of High Intensity Noise - General Effects. (Black and white, sound, 20 minutes)
   This film briefly presents the importance and the increasing acuity of exposure of personnel to high intensity noise in military operations; presents the fundamental physics of noise related to an understanding of the effects of noise on human beings; depicts the extent of exposure of military personnel and shows the undesirable biological effects of high intensity noise. Basically, this film is for medical department personnel.
2. MN-9318b: Medical Aspects of High Intensity Noise - Prevention of Hearing Losses. (Black and white, sound, 20 minutes)

This film demonstrates that levels of exposure to high intensity noise in military operations are above acceptable safe standards for such operations if a man is unprotected; presents how and why hearing losses may be caused by noise; suggests a clinical procedure to be followed by the medical officer aboard ship in the detection of hearing losses; depicts the various types of protective devices available to personnel to reduce noise levels to a tolerable level; emphasizes the responsibility of the medical officer for distributing and fitting the devices; and demonstrates the correct method for their use. Screenings of this film have been restricted to personnel of the Medical Department.

3. MN-9318c. Medical Aspects of High Intensity Noise - Ear Defense. (Black and white, sound, 20 minutes)
This film suggests the type of personal damage that may result from exposure to high intensity noise; presents the physics of noise basic to a proper understanding of how noise may affect human beings; shows the extent of exposure to high levels of noise in military operations and how such high levels may affect operating personnel; depicts the various devices that are available for protection against noise, their advantages, how to use them properly, and the duty stations at which such protection should be used. A brief summary emphasizes the benefits to be gained by wearing protective devices. This film has been especially produced for operating personnel.

Release prints of the above films have been distributed to district training aids libraries, aviation, and Marine Corps film libraries. Naval activities desiring to make use of the films should contact the nearest available naval library source. It is suggested that Department of Air Force activities contact their own film libraries since it is anticipated that the films will be distributed by that Department. Other activities, both governmental and non-governmental, may obtain the films on a short-term loan by addressing a request to the Bureau of Medicine and Surgery (Attention: Code 3163), Washington 25, D. C.

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Postgraduate Courses in Aviation Medicine

The Third Annual Postgraduate Course in Aviation Medicine for Physicians and Scientists will be given at the Health Center, Ohio State University, Columbus 10, Ohio, on September 10-14, 1956. This course should be of value as a refresher for flight surgeons and aviation physiologists. The program outline briefly consists of physical fitness of aircrewmen, passenger safety, medical administration, and space travel. The registration fee is $75.

The School of Medicine at the University of California, Los Angeles 24, Calif., announces a Course in Aviation Medicine for October 24-26, 1956. The subjects to be presented in this course are ophthalmology, physiology, cardiology, psychology, space medicine, and otolaryngology. This course will be presented by Dr. Bruce V. Leamer and supported by such well known authorities in the field of aviation medicine as Captain Oran W. Chenault, MC USN, Colonel John P. Stapp, USAF (MC), and several other outstanding men. The registration fee is $50.

Application for attendance at such courses should be made in accordance with BuMed Instruction 1520.8.

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Aviators' Individual First Aid Kit

There is available for issue to all pilots as individual first aid equipment for emergency use, a First Aid Kit, Aviators, Camouflage. This can be found in the Armed Services Medical Stock List as Stock No. 6545-919-7675. It contains enough equipment for a pilot to take reasonable care of himself in an emergency.

BuMed Notice 6710 of 20 July 1955 is the authority for the change in the size of the morphine syrettes. The legality of morphine's being issued to pilots should be governed locally by reference to the Manual of the Medical Department, Chapters 3-34(2) and 3-35(2). It will be noted from reviewing the Armed Services Medical Stock List of January 1956 under Components of Sets, Kits, and Outfits, that this kit also contains Scopolamine Hydrobromide tablets 1/100 gr. in packages of six tablets. This can be replaced locally by Dimenhydrinate in packages of eight taablets, Stock No. 6505-261-7249. In place of the Sulfadiazine tablets in the kit, there can be substituted locally packed Terramycin. Plans at this time are to replace both the Sulfadiazine and Scopolamine centrally when Terramycin (five-pack tablets) are available and the Dramamine (Dimenhydrinate) with six-pack units of Bonamine. These kits are available at the Medical Store Section of any local Supply Depot.

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Plaudits for Aviation Physiology Training Units

Excellent work is continuing to be done by all hands in our Aviation Physiology Training Units. Due to the added impetus for increased training directed by OpNav Instruction 3740.3A, reports from the field have shown a marked increase in all phases of training.

Comparison of the year ending 30 June 1956 with a similar period of 1955 reveals, for example, a 54% increase in ejection seat trainer shots, a 14% increase in three-dimensional night vision training, a 50% increase in oxygen physiology lectures, and a 26% increase in low pressure chamber flights. In the year ending 30 June 1956, 11,585 persons were taken on low pressure chamber flights to a simulated altitude of 43,000 feet and 10,271 to the 30,000-foot level; 12,833 persons were indoctrinated in the three-dimensional night vision trainer; and 9,438 ejection seat trainer shots were made.

This fine work is to be highly commended and results of this professionally-given training will surely show up as an improvement in the Navy's flight safety record.

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The date of the course in Forensic Pathology, AFIP, is changed to 29 October - 2 November 1956. Refer BuMed News Letter, Volume 28, Number 2, page 20.

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